

1     ABSTRACT OF THE DISCLOSURE

2             The invention encompasses a semiconductor processing method of  
3     cleaning a surface of a copper-containing material by exposing the  
4     surface to an acidic mixture comprising  $\text{Cl}^-$ ,  $\text{NO}_3^-$  and  $\text{F}^-$ . The invention  
5     also includes a semiconductor processing method of forming an opening  
6     to a copper-containing substrate. Initially, a mass is formed over the  
7     copper-containing substrate. The mass comprises at least one of a  
8     silicon nitride and a silicon oxide. An opening is etched through the  
9     mass and to the copper-containing substrate. A surface of the copper-  
10    containing substrate defines a base of the opening, and is referred to as  
11    a base surface. The base surface of the copper-containing substrate is  
12    at least partially covered by at least one of a copper oxide, a silicon  
13    oxide or a copper fluoride. The base surface is cleaned with a cleaning  
14    solution comprising hydrochloric acid, nitric acid and hydrofluoric acid  
15    to remove at least some of the at least one of a copper oxide, a silicon  
16    oxide or a copper fluoride from over the base surface.